

responded on the record prior to proceeding to appeal, given the confusion and inconsistencies in the rejection currently of record.

It is noted that Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Claims 1-20 are all of the claims pending in the present Application. Claims 19 and 20 stand rejected under 35 USC §102(e) as anticipated by US Patent 5,970,464 to Apte et al. Claims 1-18 stand rejected under 35 USC §103(a) as unpatentable over Apte, further in view of US Patent 5,692,107 to Simoudis et al.

These rejections are respectfully traversed in view of the following discussion.

## **I. THE CLAIMED INVENTION**

As described and claimed (e.g., by independent claim 1), the present invention is directed to a program storage device readable by a machine for constructing segmentation-based models that satisfy constraints on the statistical properties of the segments. The computer program presents a collection of training data records comprising examples of input values that are available to the model together with the corresponding desired output value(s) that the model is intended to predict. The program then generates, on the basis of the training data, a plurality of segment models, that together comprise an overall model. Each segment model is associated with a specific segment of the training data.

The generating includes performing an optimization that includes generating alternate training data segments and associated segment models, evaluating at least one generated segment to determine whether it satisfies at least one statistical constraint, and selecting a final plurality of segment models and associated segments from among the alternates evaluated that have satisfactory evaluations.

An advantage of the present invention is that it provides a technique analogous to the distinction between closed-loop and open-loop systems. That is, as discussed beginning on page 33, beginning at line 14, relative to techniques discussed in the specification, the present invention applies statistical constraints as segment splits are being constructed, thereby guiding the segment construction process.

The prior art reference Apte does not generate the optimal model segments achieved by the present invention, let alone teach or suggest the closed loop that the computer program achieves automatically or teach or suggest using statistical constraints to guide the segment construction process.

## II. PRIOR ART REJECTION

The Examiner alleges that US Patent 5,970,464 to Apte et al. teaches the present invention, but concedes that the primary reference “fails to expressly disclose ‘a program storage device readable by a machine tangibly embodying a program of instructions’ in the preamble.”

To overcome this deficiency, the Examiner then introduces US Patent 5,692,107 to Simoudis et al. The Examiner further asserts that one of ordinary skill in the art would have been motivated “to expand Apte’s computer-implemented method of underwriting profitability analysis to include this limitation, as taught by Simoudis, with the motivation of providing means for storage and retrieval of program data and instruction to be used at a later time”.

Applicant has responded to this rejection and does not repeat herein that response in its entirety. However, the following discussion further clarifies Applicant's position.

It is noted that, in the attached Declaration under 37 C. F. R. §1.132, Applicant submits on the record that he not only is a recognized expert in this art but that he is also a co-inventor of Apte. The following explanation is based on the Applicant's expertise in this art as well as his understanding of Apte as a co-inventor.

The term "pure premium" has a clear and unambiguous specific meaning in this art. The use of the adjective "actual" in Apte has to do with the choice of sentence construction in Apte, rather than being an additional term of art.

The issue with the Examiner's interpretation of "actual pure premium" is that he completely misinterprets the meaning of the only sentence in Apte et al. that contains this term (Apte, col. 3, line 65 to col. 4, line 1), as follows. Unfortunately, the sentence contains ellipses, which may be part of the Examiner's confusion. Below is a rewrite of the sentences

without ellipses (e.g., with implied words appearing in square brackets). For clarity, also presented below is the immediately preceding and following sentences in Apte that establish the context for the ellipses.

*".... The consequence <sic> of such rules will typically be a prediction of a pure premium for the data points that satisfy the antecedent. The prediction will be probabilistic, i.e., associated with the prediction, in addition to the actual [predicted value of the] pure premium, will be estimates of the accuracy [of the said predicted value] and [of the statistical] confidence in the [said] accuracy. An example of a rule extracted by the data mining process might be "If `male driver` and `age less than 25` and `car type is 2-door sports sedan`, Then `estimated quarterly pure premium=\$700` with `error estimate=0.2` and `confidence interval=0.008`."*

Thus, in the above quote, the first sentence establishes that the consequents of the rules that are produced by data mining comprise predictions of pure premium. The sentence in question then establishes that each such prediction of pure premium has three parts: (1) a predicted pure premium value, (2) an estimated accuracy of said predicted pure premium value, and (3) a statistical confidence in the said estimated accuracy. The third sentence then presents an example of a rule in which all three said parts of a prediction of pure premium appear in the consequent of the example rule.

The Examiner has flatly rejected the interpretation of "the actual pure premium" to mean "the actual predicted value of the pure premium". Instead, the Examiner has ignored the definite article "the" that precedes "actual pure premium" in the sentence in question, and has apparently adopted the position that the definite article "the" can be replaced with the indefinite article "an." The Examiner has then taken the liberty to interpret an "actual pure premium" to mean a desired quarterly premium to be charged for a proposed insurance product (see Section 7A of the latest Office Action).

Replacing "the" with "an" is invalid because it changes the logical meaning of the sentence in question. Interpreting "pure premium" to mean the premium charged for an insurance product is also invalid because the two terms have distinct specific meanings in the insurance field.

Moreover, these specific meanings are described in Apte, col. 1, lines 29 to 35. It is noted that Applicant does not need to make the assertion that the terms differ, it is already done in Apte. Thus, the Examiner's argument is illogical because it clearly ignores Apte, col. 1, lines 29 to 35 in the most recent Office Action.

In addition to the above clarification, Applicant additionally clarifies his response for imminent appeal and to update it for the Examiner's concerns raised in the Office Action dated August 13, 2003, as follows.

First, on page 17 of the Office Action, the Examiner alleges that the claim language does not recite the aspect of the "closed loop" that the present invention provides over the prior art. In response and taking claim 1 as an example, Applicant points to the second limitation, beginning with "generating on the basis ...", and concluding with the sub-limitation that begins "selecting a final plurality ...."

This second limitation provides the closed loop aspect in which segmentation is optimized. As stated repeatedly on the record, this second limitation differs from Apte in that the present invention achieves this closed loop by using the software program itself, not steps done by the user, as described in lines 28-54 of column 4 of Apte.

It is noted, for the record, that the claims actually recite specific steps in the closed-loop process that distinguish this closed-loop process from the prior art. It is not necessary to specifically recite in the claim that a "closed loop" is achieved, if distinguishing steps in the closed loop process itself are already being recited. That is, to one of ordinary skill in the art, this description is one that would achieve a closed loop. It is the Examiner who fails to understand the significance of this description.

Moreover, by claiming distinguishing steps of the closed loop process, Applicant clearly is not claiming beyond that which he has invented. That is, Applicant is not claiming any and all closed loop processes, only that one closed loop technique specifically described in the disclosure. If anything, the present independent claims are narrower than warranted, based on Apte.

Second, Applicant submits that the rejection of record inherently contradicts itself. On the one hand, the Examiner seems to suggest that the terminology of the preamble (e.g., in claim 1: "A program storage device readable by a machine, tangibly embodying a program

of instructions executable by the machine to perform a method for constructing segmentation-based models that satisfy constraints on the statistical properties of the segments") is not to be given patentable weight. Presumably, such lack of patentable weight allows the Examiner to disregard that it is computer software, not a human user, that is executing the method described in the claim limitations. (It is noted, again, that Applicant has repeatedly stated on the record that the description at lines 28-54 of column 4 of Apte is a description of steps taken by the human operator, not the software by itself.)

On the other hand, the Examiner then adopts the opposite position that the primary reference is deficient by reason that it "... fails to expressly disclose 'a program storage device readable by a machine, tangibly embodying a program of instructions' in the preamble." The Examiner then alleges that the secondary reference Simoudis describes a computerized data mining method that overcomes the deficiency in Apte.

Applicant submits that the Examiner's contradictory position inherently renders the rejection of record invalid on its face as being illogical. That is, the Examiner first interprets the claim language in a first manner, in order to allege that the primary reference reads on the claim limitation. The Examiner then adopts the illogical position that his first interpretation is incorrect, but that the secondary reference overcomes the deficiency identified in the second interpretation.

Third, it is noted that the Examiner is required to provide patentable weight to the preamble wording, since the subsequent limitations "breathe life into" not only an explanation of what the computer program does but also how the computer program achieves the result.

Fourth, Applicant repeats on the record that "pure premium" is a term of art. The attached Declaration Under 37 CFR §1.132 documents the Applicant's status as an expert in the art, thereby establishing the Applicant's authority to assert that one of ordinary skill in the art would not interpret the term "actual pure premium" as used in Apte as a "statistical constraint", as the Examiner has done in the rejection currently of record.

By reason of being a term of art, as clearly described in MPEP § 2111, the Examiner's prerogative to make the broadest reasonable interpretation is curtailed in that the Examiner's

"... interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach." (Emphasis by Applicant)

Fifth, the attached declaration also addresses the concern raised by the Examiner in the first paragraph of page 18 of the Office Action, in which the Examiner alleges that the Applicant has misinterpreted Apte. In this declaration, Applicant declares that he is one of the co-inventors of Apte and, by such status as a co-inventor in the only prior art reference currently applied against the present invention, submits that it is the Examiner who misinterprets Apte.

Sixth, Applicant submits that the combination of Simoudis with Apte, as urged by the Examiner, is improper under MPEP §2143.01: "The proposed modification cannot change the principle of operation of a reference." In the present rejection, it is clear that the Examiner intends to convert the operator-assisted steps described at lines 28-54 of column 4 of Apte into an automated sequence, thereby entirely changing the principle of operation of Apte.

Seventh, Applicant submits that the urged combination of Apte/Simoudis is improper for a second evaluation guideline in MPEP §2143.01: "A statement that modifications of the prior art to meet the claimed invention would have been " ' well within the ordinary skill of the art at the time the claimed invention was made' " because the references relied upon teach all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references." That is, the Examiner's statement "... However, this feature is old and well known in the art as evidenced by Simoudis's teachings ..." clearly violates this guideline.

Eighth, Applicant submits that the urged combination of Apte/Simoudis is improper for a third evaluation guideline in MPEP §2143.01: "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination" (emphasis in MPEP itself). In the present rejection, the Examiner overlooks that Apte functions perfectly well without any modification whatsoever. There is no suggestion whatsoever in Apte to automate the user's inputs described in column 4, let alone provide a software technique for optimizing the model segments.

Ninth, even if Simoudis were to be incorporated into Apte, as urged by the Examiner, the rejection of record fails to explain how the top-down/bottom-up data mining procedure described in Simoudis can be reasonably considered by one of ordinary skill in the art as resulting in the invention described in, for example, claim 1. That is, as explained at lines 44-49 of column 1 of Simoudis, a top-down system involves pattern validation, "... a type of analysis that allows an analyst to express a piece of knowledge, validate or [in]validate that knowledge, and obtain the reasons for the validation or invalidation." As explained at lines 52-54 of column 1, bottom-up systems "... discover knowledge, generally in the form of patterns".

Without additional explanation by the Examiner, neither of these data mining procedures provides a basis to allege that, when combined with Apte, the resultant combination then reads on the independent claims. That is, not only does the Examiner misinterpret Apte, but the Examiner seems confused as to the effect achieved if the data mining technique of Simoudis were to be incorporated into the technique of Apte.

The fact of the matter is that data mining is already incorporated into the technique of Apte at block 102 in Figure 1 (Apte, col. 3, lines 22 to 29) and at block 511 in Figure 5 (Apte, col. 6, lines 4 to 6). As described in Apte, this data mining is "based on standard technology" (Apte, col. 3, line 26). The substitution into Apte of the data mining technique of Simoudis does not at all transform Apte into the present invention.

In contrast, the present invention is directed toward new and novel technology that replaces blocks 102 and 511 in Apte with superior data mining techniques for insurance modeling purposes. Moreover, Apte makes a clear distinction between the data mining process that is performed at blocks 102 and 511 of Apte, and the scenario analysis process illustrated in Figure 14 of Apte that uses the results of data mining to analyze insurance products (i.e., books of business) to provide useful information to end-users to better enable them to manually adjust customer eligibility criteria (i.e., underwriting rules) for those insurance products so as to ensure profitability.

The Examiner is seemingly trying to confuse this distinction made in Apte by using the scenario analysis process of Apte as prior art to reject the present claims that are directed toward a data mining process. In this respect, the Examiner's argument is also illogical

because data mining and scenario analysis are two separate processes with different specific purposes. The purpose of the data mining is summarized in Apte, col. 1, lines 52 to 60. The role of the scenario analysis is summarized in Apte, col. 2, lines 7 to 10.

Moreover, beginning at line 43 of column 4, Simoudis likewise requires user interaction. Therefore, even if Simoudis were to be incorporated into Apte, the rejection of record fails to explain how this combination achieves the automatic optimization described by the claims in which the computer program itself uses statistical constraints to generate optimal segmentation.

Tenth, the rejection of record relies upon the improper technique, unfortunately commonly used by Examiners, in which words are taken out-of-context with the intent of attempting to present a credible rejection that has no meaning whatsoever. More specifically, in the present rejection, the Examiner alleges beginning at line 7 of page 7: "It is respectfully submitted, that it would have been obvious to one having ordinary skill in the art at the time the invention was made to expand Apte's computer-implemented method of underwriting profitability analysis to include this limitation, as taught by Simoudis, with the motivation of providing means of storage and retrieval of program data and instruction to be used at a later time."

The Examiner fails to identify the source of this statement of motivation. Perhaps the Examiner's wording arose from lines 26-27 of column 2 of Simoudis: "The predictive models finally may be stored 209 in a repository 110 for future use."

Regardless of its source, upon a closer evaluation of the Examiner's wording, it is clear that these words, intended as a motivation to modify Apte, add nothing substantive to the present evaluation. First, it is merely a conclusory statement of a purported result. Second, this statement is already inherent in any "computer-implemented method of underwriting profitability analysis", as the Examiner characterizes Apte.

Indeed, the statement of motivation to modify Apte is inherent in any computer-implemented method whatsoever, since any computerized method inherently possesses a "means of storage and retrieval of program data and instruction to be used at a later time".

That is, the Examiner is understood as expecting the Board of Appeals to believe that Apte, already a computerized method, is deficient because it fails to have a "means of storage



and retrieval of program data and instruction to be used at a later time". The Board is also expected to believe that the computerized method of Simoudis would somehow remedy the deficiency identified by the Examiner for the Apte computerized method.

It would seem that such ludicrous conclusions will invariably occur when Examiners take words out-of-context and incorporate them as a motivation into a rejection without taking time to consider the commonsense engineering reality.

Eleventh, even if the Examiner's motivation to modify Apte were to be considered as reasonable in an engineering sense, the rejection of record overlooks another key evaluation guideline discussed at MPEP §2141.02: "In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious."

As Applicant keeps repeating on the record, the technique described by the claimed invention provides a closed loop approach, as explained briefly in lines 20-25 of page 33, by applying statistical constraints as an integral part of automatically generating new segments. Neither this closed loop approach nor the use of a statistical constraint is suggested in Apte.

Apte does not incorporate a computer program that automatically optimizes model segments. Simoudis likewise does not incorporate such a feature of automatically optimizing model segments. Common sense should clearly be sufficient to recognize that combining Simoudis with Apte will somehow mysteriously provide a benefit that neither Apte nor Simoudis provides.

For any of the above reasons, the rejection of record is clearly improper and the present invention is clearly patentable over Apte.

Hence, turning to the clear language of the claims, there is no teaching or suggestion in the Apte reference of "... generating alternate training data segments and associated segment models; evaluating at least one generated segment to determine whether it satisfies at least one statistical constraint ...", as required by claim 1. Similar language is in all independent claims. Simoudis does nothing to make up for this deficiency, even if it were properly combinable with Apte.

Accordingly, for this reason alone, claims 1-20 are fully patentable over the Apte reference.

Further, the other prior art of record has been reviewed, but it too, even in combination with the Apte or Simoudis, fails to teach or suggest the claimed invention.

### III. FORMAL MATTERS AND CONCLUSION

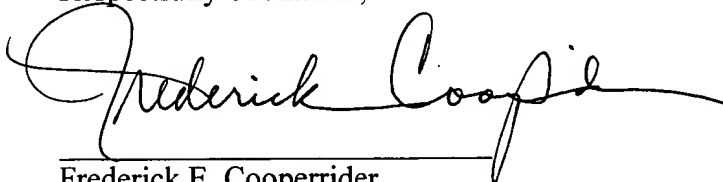
In view of the foregoing, Applicant submits that claims 1-20, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Date: 10/14/03

Respectfully Submitted,



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